Oct. 10, 1933. M. J. TRUMBLE ET AL 1,929,659

GAS AND VAPOR PURIFICATION APPARATUS

Filed Dec. 13, 1930

FIG. 1.

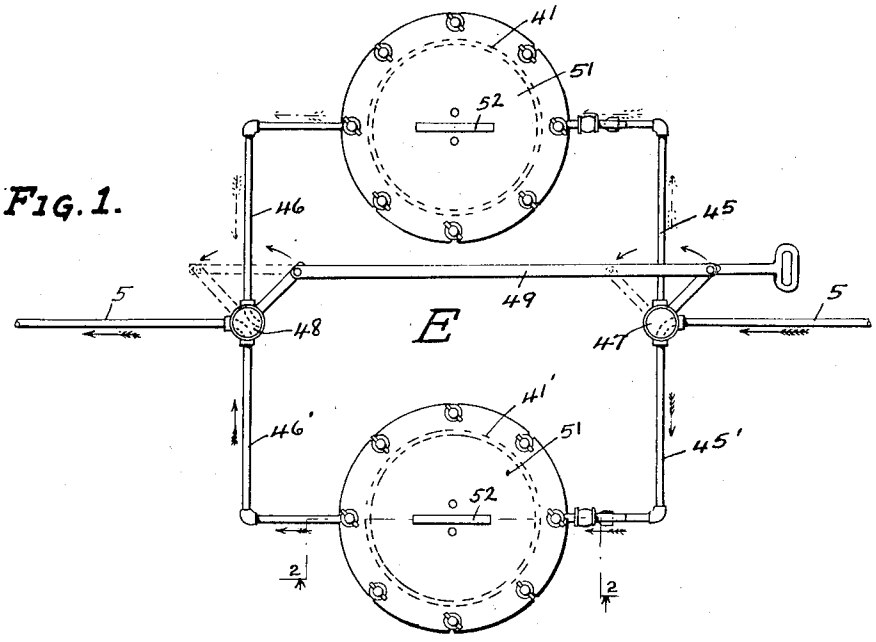


FIG. 2.

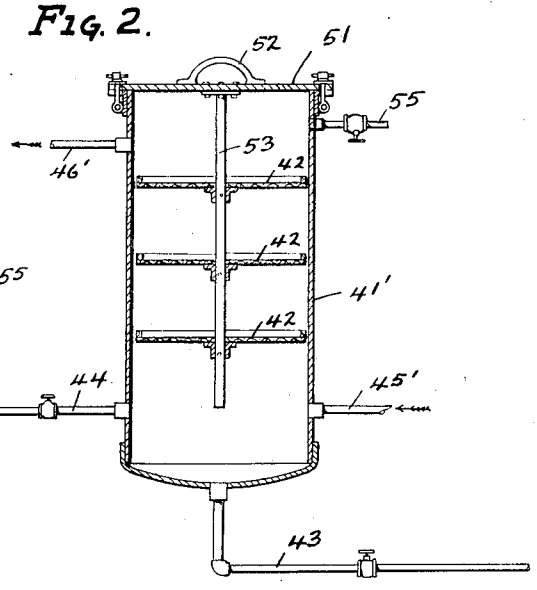
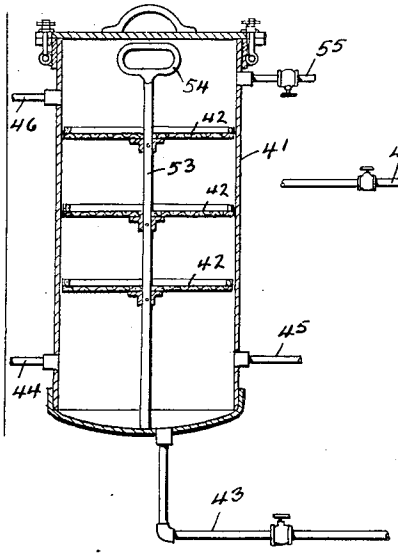


FIG. 3.



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GAS AND VAPOR PURIFICATION APPARATUS

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Application December 13, 1930
Serial No. 502,143

3 Claims. (Cl. 23—260)

This invention relates to gas and vapor purification apparatus and especially to such apparatus used in connection with processes for the manufacture of gasoline from heavier hydrocarbon oils.

The principal object of the invention is to provide quickly operated apparatus of the kind mentioned for the removal of sulphur from gasoline vapors and gases evolved in the production of gasoline by cracking and hydrogenation. Also a particular arrangement of a plurality of the appartus units whereby one may be switched in the gas or vapor pipe line and the other out of action, also means whereby this may be simultaneously accomplished. Another object is to provide for easy renewal of gas purifying material within the apparatus. Other features of advantage will appear in the following description and drawing accompanying this description.

In the drawing Fig. 1 is a plan view of two of our purification units piped and valved in the manner of our invention.

Fig. 2 is a vertical cross section of one of the units of Fig. 1 as seen from the line 2—2 thereof.

Fig. 3 is a view similar to that of Fig. 2 showing modified details of construction.

Before describing the drawing in detail it would be well to state that the apparatus was devised particularly to carry out a continuous process of hydrogenation fully described in our application for U. S. patent filed simultaneously herewith under Serial No. 502,146, entitled "Hydrogenation process and apparatus" and that all designating characters, and numbers below 50 are the same as used on similar parts in the drawings of the case referred to, for the purpose of establishing its relation thereto.

In further detail the apparatus generally designated E comprises a pair of cylindrical chambers 41, 41' interposed in a gas or vapor pipe line 5 connected by branch pipes 45, 45' and 46, 46', controlled by three-way valves 47, 48 the levers of which are linked as at 49 for simultaneous action so that by a single one-way movement of the link the run of pipe will be opened through one of the chambers and closed against the other, and vice versa.

The gas and vapor flows through the pipe in direction indicated by the arrow entering near the lower end of the chamber and leaving near the top.

A quick removable cover 51 of any approved design is fitted over the upper end of each chamber and extending downwardly from this cover is a rod 53 supporting a plurality of disk screens 42 which fit easily within the cylindrical chamber and are spaced one above the other, the arrangement being such that upon releasing the lid it may be lifted off by means of its handle 52 and will carry with it the several screens together with any gas purifying material they may contain so that another assemblage of lid and screens with fresh material may be quickly dropped into place.

Instead of the lid being connected to the screen assemblage it may be separate as shown in Fig. 3 wherein the rod 53 rests upon the bottom of the chamber to support the screens and a handle 54 is provided on the upper end of the rod for lifting it out.

At the bottom of the chamber is a suitably valved drainage pipe 43 and at the side near the bottom is a suitably valved steam pipe 44 for cleaning out sulphur or other impurities deposited from the gases and vapors or by the action of the purifying material on the screens and through which the gases and vapors must circulate.

A steam blow-off pipe 55 is also provided near the top of the chamber to relieve the steam pressure after cleaning or to blow steam through the screens to cleanse them and drive off any volatile matter.

In using the apparatus for the desulphurizing of gasoline vapors we find a satisfactory purifying agent to be copper oxide, a layer of which is placed over each screen for taking up the sulphur by conversion to copper sulphate with release of some CO_2 and the formation of some metallic copper. When tests of the vapors indicate too much sulphur passing through the chamber, or upon definite time intervals determined from such tests, the flow of vapors and/or gas is instantly switched through the other chamber containing fresh or rejuvenated material without interruption of the continuous process in which the apparatus is used, so that the spent material in the first chamber may be quickly replaced by sliding a new screen assemblage into place, or the chamber may be blown out without contaminating the gas line.

In our appended claims the word "gas" is intended to include either gas, vapor, or a mixture of gases and vapors.

Having thus described our invention we claim:—

1. Gas purification apparatus comprising a cylindrical chamber having a gas inlet and a gas outlet through the side of the chamber, a removable cover at the upper end of said chamber, a

device depending from said cover, and supporting means for a gas purifying agent carried by said device for removal with said cover.

2. Gas purification apparatus comprising a cylindrical chamber having a gas inlet and a gas outlet through the side of the chamber, a door at the end of said cylinder, a gas purification assemblage adapted for withdrawal through said end of the cylinder means for blowing out the chamber with steam while said door is closed, and drainage means for said cylinder.

3. Gas purification apparatus comprising a pair of gas purifying chambers, piping connecting the gas inlets of both chambers to a common gas supply line, piping connecting the gas outlets with a common purified gas line, a three-way valve on both inlet and outlet piping arranged for selectively cutting either chamber in and at the same time the other chamber out of operative relation with the gas supply and purified gas line respectively, and means for operating the valves simultaneously.

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